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GB 793163
GB 845340
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GB 489824

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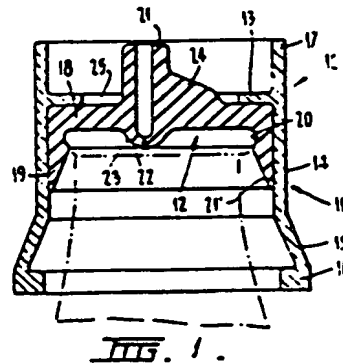
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(54) Improvements in closures

(57) A closure 10 for a necked container, such as a bottle, comprises an outer cap member 11, and an inner resilient sealing member 12 provided with a slit 22, the inner member being displaceable within the outer cap member from a position in which it can be fitted around the neck of the container to a position (as shown) in which it is compressed by the outer cap member and is thus caused to form a seal around the neck, the slit acting as a vent valve when the closure is in sealing engagement with the container.



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SPECIFICATION

Improvements in closures

- 5 This invention relates to improvements in closures and in particular to improvements in closures which are to be used, say, by a home brewer to control the pressure in his brew and to enable the sediment to be withdrawn therefrom so that when the brew is poured it is clear.
- 10 In the home brewing of beer and sparkling wines, the last part of the fermentation process occurs in the bottle either by the brew being placed in the bottle when reaching a finally determined specific gravity level or by a secondary fermentation process in which a yeast and sugar mixture is added to the bottle before corking or sealing. In each case the fermentation transfers the sugar into a mixture of alcohol and carbon dioxide and in this way the carbon dioxide bubbles are formed in the brew but, at the same time, dead yeast cells fall to the bottom of the brew as a sediment.
- During this process there are two inherent disadvantages. The first is, if the amount of sugar is too high either the seal may blow or the bottle may break and the second is that when the seal is deliberately opened, one has to be extremely cautious in pouring the brew to avoid the sediment being disturbed.
- 30 In a champagne type process, the sediment is disgorged by inverting the bottle, permitting the sediment to fall to the neck of the cork, freezing the neck of the bottle, removing the cork to permit the sediment to be blown from the bottle, making up the champagne in the bottle and recorking the bottle. This process is tedious and needs great skill.
- The object of the invention is to provide a relatively simple and cheap closure member which can be used to overcome the two previously enumerated disadvantages.
- 40 The invention includes a closure having an outer rigid cap member and an inner flexible and resilient sealing member, the outer cap member having a lower portion which is of a diameter substantially greater than the neck of the bottle with which the closure is to be used and a main body portion which is of a diameter greater than, but not substantially greater than, the neck of the bottle with which the closure is to be used, the inner member being formed with a tapered lower end and a formed upper end and being adapted to be moveable from a position where a bottle neck can be received therein to a position where the body of the outer member causes compression and thus a seal about the open end of the bottle, characterised in that the inner member has a slit therein.
- Functionally, the slit is in the inner end of a protruberance and is so formed that its walls are normally in contact but which, when there is sufficient pressure, are forced apart to enable a release of pressure. Further the protruberance may be formed to include a finger receiving portion whereby when sediment is lying against the inner surface of the inner member, pressure on the finger receiving portion causes the slit to open and the sediment to

be released.

In order that the invention may be more readily understood and put into practice we shall describe, in relation to the accompanying drawings, one

- 70 embodiment of the closure member made in accordance with the invention.

In these drawings:

Figure 1 is a section through a closure member as it would be when on a bottle;

- 75 *Figure 2* is a top plan view of the shell;

Figure 3 is a section of the inner liner;

Figure 4 is a plan view of the liner; and

Figure 5 is a section along line 5-5 of *Figure 4*.

- The closure member 10 is inherently similar to previously known closures of the type, which preferably have an outer pressed aluminium or other metal shell 11 and an inner synthetic rubber or plastic liner 12. The shell basically comprises an annular top 13 and a downwardly extending skirt 14 which is flared at its lower end 15, the flared lower portion of the skirt normally having an inwardly directed portion 16 at its lower edge. In the form illustrated we also form an upwardly directed annular extension 17, the purpose of which will be described later.

- The liner has a closed upper surface 18 and a skirt 19 which internally is preferably provided with an annular recess 20 adjacent its closed upper end which recess is adapted to fit relatively closely around a rib which is formed on the upper surface of a bottle, such as a beer bottle. The skirt may have a tapered lower edge 21.

- The arrangement of closures of this general type is such that the inner synthetic rubber member 12 normally rests with its lower end 19 against the turned edge 16 of the outer member and in this position can be placed over the outer end of a bottle so that the rib on the bottle is relatively closely surrounded by the recess 20 in the inner member and on downward pressure on the outer member 11 so this moves relative to the inner member causing compression and thus a good seal about the upper end of the bottle. This condition is that shown in *Figure 1*.

- 110 The seal is basically a side seal but may well be a combination of a side and top seal. Because of this compression the rib on the bottle and the recess of the inner member prevents the closure from being accidentally removed from the bottle.

- 115 The closure of the present invention differs from this conventional closure in that there is a protruberance 21 extending outwardly from the closed upper surface 18 of the inner member which protruberance has a small slit 22 formed in its inner end. The length of this slit 22 and the size of the protruberance 21 can be varied depending upon the application of the closure. The arrangement in any case is, however, that as pressure in the bottle increases so the inner end 23 of the protruberance 21 which is a dome shape tends to keep the slit closed but when the pressure is sufficient the slit will open and pressure will be relieved. When the pressure drops to a predetermined value the slit again closes and a pre-selected pressure will be retained in the bottle. In one form of the invention we make the internal

member of silicone rubber and can form the slit so that it releases pressure when pressure reached 0.186 MPa and when the pressure drops to 0.152 MPa the slit closes and the pressure is retained at this level. The particular units stated are only exemplary and are possibly higher than would normally be required, for example, when brewing beer, but by simply making the thickness of the bottom of the protruberance less or by making the diameter of the protruberance or the length of the slit greater, the pressure can be varied.

Formed on the top of the inner member 12 there is preferably a ramp like member 24 which is integral with the top of the inner member and with one side of the protruberance and preferably the width of this ramp like member is in the direction of the length of the slit.

When the fermentation process is completed, which process is effected with the bottle upright, so that pressure can be relieved then the bottle can be inverted and stood on the extension 17 and left in an inverted condition until the sediment in the bottle falls to the inner surface 18 of the inner member of the closure. At this stage finger pressure on the ramp like member 24 will cause the slit 22 to be physically opened and the sediment to be disgorged.

Provided such operation is done with discretion a minimum amount of the contents of the container will be lost.

Whilst we have described the slit as being in the lower end of the protruberance 21 it would be possible to form this in the upper surface of the inner member and in this case it may be that portion of the upper surface can be made thinner than the remainder so as to obtain the pressure controlling effect or the whole of the surface may be made relatively thin and the aperture 25 in the annulus of the outer member may be made small so that the portion containing the slit is enabled to dome outwardly by being the only portion which can pass through the aperture.

In such an arrangement, to enable the slit to be physically opened for disgorgement an extension or the like may be provided so that one lip of the slit can be deformed inwardly and part of the contents of the bottle can be expelled.

It will be appreciated that the closure member of the invention will be relatively cheap to produce and because it will be physically deformed only once per use it could be expected to have a relatively long life. Thus, even if a brewer needs to buy a large number of dozens of the closure member, these would not be exorbitantly expensive and their cost could well be amortised over a long period.

CLAIMS

1. A closure for a necked container comprising an outer rigid cap member and an inner flexible and resilient sealing member having a slit therein, the outer cap having a lower portion which is of a diameter substantially greater than the neck of the container and a main body portion which is a diameter greater than, but not substantially greater than, the neck of the container, the inner member

being formed with a tapered lower end and a formed upper end and being displaceable from a position where a bottle neck can be received therein to a position where the body of the outer member causes compression thereof so that a seal is formed about the open end of the bottle.

2. A closure as claimed in Claim 1, wherein there is a protruberance from the upper end of the inner member, the slit being formed in the protruberance.

3. A closure as claimed in Claim 2, wherein the lower end of the protruberance is below the level of the remainder of the formed upper end and it is in this lower end that the slit is formed.

4. A closure as claimed in any preceding Claim, wherein there is a finger receiving portion which, when pressed, physically opens the slit.

5. A closure as claimed in Claim 4, when appended through Claim 2 or Claim 3, wherein the finger receiving portion comprises a ramp which is integral with the upper end of the inner member and the protruberance.

6. A closure as claimed in Claim 1, wherein the inner member has an area thinner than the remainder of the member, the thinner area having the slit therein.

7. A closure as claimed in Claim 1, wherein the cap member has a relatively small aperture and wherein the formed upper end is thin and part of this can pass through the aperture; the portion which can pass through the aperture having the slit therein.

8. A closure as claimed in Claim 6 or Claim 7, wherein there is a finger receiving portion, which, when pressed, physically opens the slit.

9. A closure substantially as hereinbefore described with reference to the accompanying drawings.

New claims or amendments to claims filed on 26.2.79.

Superseded claims 1 - 3.
New or amended claims

1. A closure for a necked container comprising an outer rigid cap member and an inner flexible and resilient sealing member having a formed upper end and a peripheral skirt, a downwardly-directed protruberance in the formed upper end having a slit therein, the outer cap member having a lower portion which is of a diameter substantially greater than the neck of the container and a main body portion which is of a diameter greater than, but not substantially greater than, the neck of the container, the inner member being formed with a tapered lower end and being displaceable from a position where a container neck can be received therein to a position where the body of the outer member causes compression thereof so that a seal is formed about the open end of the container.

2. A closure as claimed in Claim 1, wherein the protruberance also has a portion directed upwardly from the formed upper end of the inner member.

3. A closure as claimed in Claim 2, wherein the upwardly-directed portion of the protruberance surrounds the downwardly-directed portion forming a tube leading therefrom.

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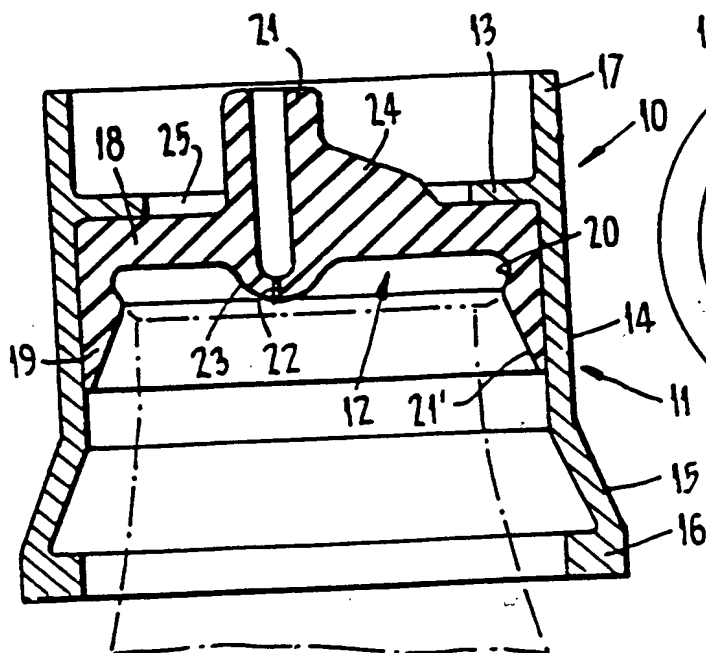


FIG. 1.

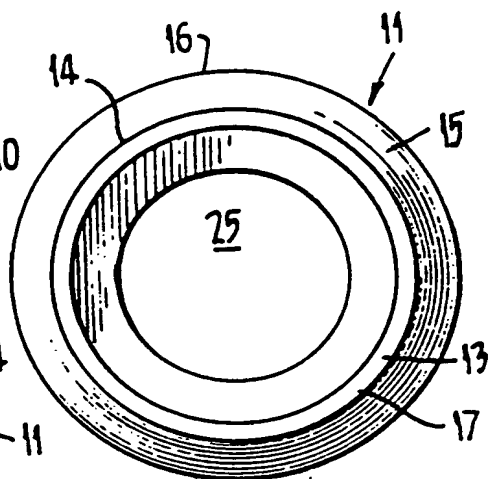


FIG. 2.

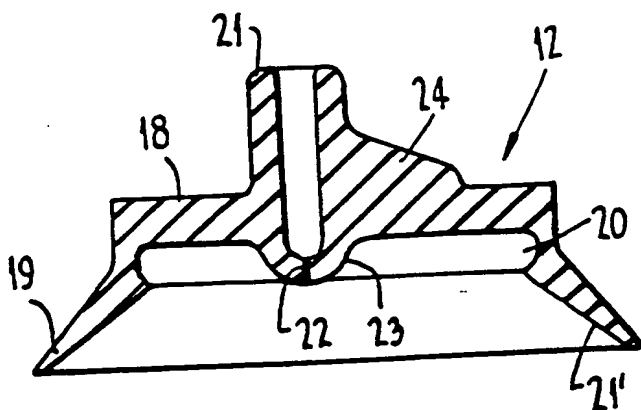


FIG. 3.

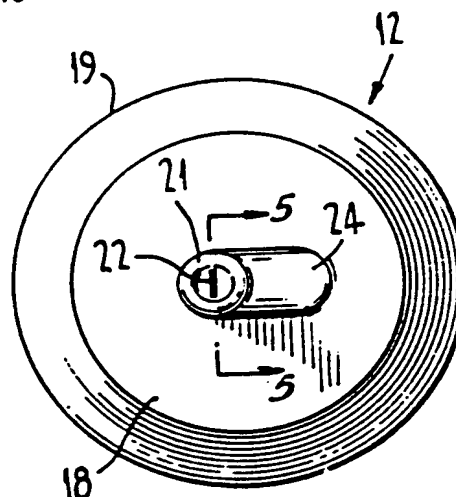


FIG. 4.

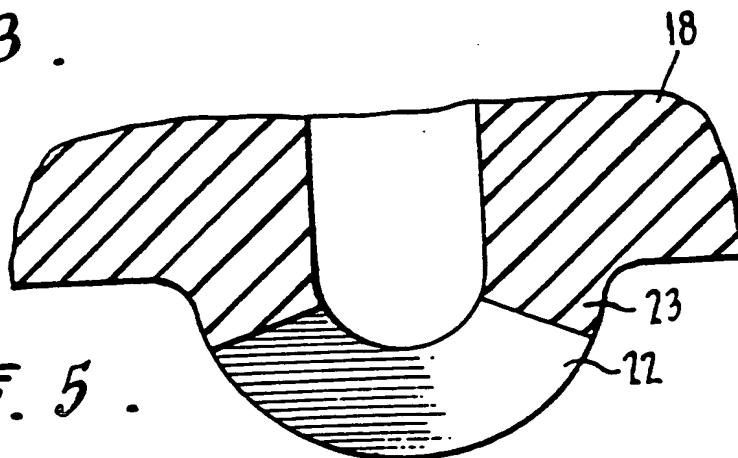


FIG. 5.